Implication of the January 1990 Volcanic Eruption on 10 for Resurfacing Rates and Energetics.

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The high temperature event observed by ground based infrared radiometry of 10 in January of 1990 can be modeled as an extremely active silicate lava flow which increased its area and cooled over a period of three hours. The best model at the start of the observations is a thermal source at 1200 K with an area equal to that of a circle of 5.6 km radius, while at the end of the observation sequence a source with a temperature of 700 K and a 13 km radius provides the best match, Given a flow thickness of 10 m, this implies an eruption rate of 300,0000 cubic meters per second. This is large by terrestrial standards but consistent with estimates of lunareruption rates (} lead and Wilson 1981) and some terrestrial eruptions such as the 1800-1801 Hualalai flow in Hawaii (Baloga and Spudis 1992). This rate and frequency of eruption from ground based observat ions (roughly 5% of the time observed) is consistent with the global resurfacing rates implied by crater densities and with the observed volcanic heat flow (> 2.7 W/m^2). Although still based on a relativbely limited sample of 10's volcanic activity, these observations suggest that the lack of small impact craters, the high level of current heat flow and the distribution of areas and temperatures of volcanic thermal anomalies arc all consistent with vigorous resurfacing by silicate flows over approximately the last 10,000 years. (This work was done at JPl./Caltech, under contract to NASA.)